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ABSTRACT OF THE DISCLOSURE

A semiconductor device has an element substrate including a semiconductor layer of a first conductivity type being formed over a semiconductor substrate with a dielectric film interposed therebetween. A groove is formed in the element substrate with a depth extending from a top surface of the semiconductor layer into the dielectric film, the groove having a width-increased groove portion in the dielectric film as to expose a bottom surface of the semiconductor layer. An impurity diffusion source is buried in the width-increased groove portion to be contacted with the bottom surface. A transistor is formed to have a first diffusion layer being formed through impurity diffusion from the impurity diffusion source to the bottom surface of the semiconductor layer, a second diffusion layer formed through impurity diffusion to the top surface of the semiconductor layer, and a gate electrode formed at a side face of the groove over the impurity diffusion source with a gate insulation film between the side face and the gate electrode.

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